

**U.S. Environmental Protection Agency  
Scientific Integrity Program**

**Inquiry Report and Determination for Questions Involving  
Authorship in (b) (6)**

**Background on scientific integrity**

The U.S. Environmental Protection Agency (EPA) is dedicated to preserving the integrity of the scientific and scholarly activities it conducts and that are conducted on its behalf. The EPA Scientific Integrity Policy\*, dated February 2012, provides principles and standards to ensure scientific integrity in the conduct, use, and communication of science. When this policy is not adhered to, or is circumvented, the robustness of EPA science and the trust in the results of our scientific work can be impacted, causing a loss of scientific integrity. Loss of scientific integrity is the result of a deliberate action by an employee that compromises the conduct, production, or use of scientific and scholarly activities and assessments. EPA strives to prevent loss of integrity in the performance of scientific and scholarly activities or in the application of science in its decision making.

**Origin of this report**

As discussed below, the Scientific Integrity Official launched the inquiry that is the subject of this report in response to a set of questions presented by (b) (6)

(b) (6) reached out to the Scientific Integrity Official in connection with a Union grievance brought by an employee against his manager. Although no formal allegation of a loss of scientific integrity has been made by (b) (6), in the Scientific Integrity Official's view the questions presented by (b) (6) justified this inquiry and report. In addition, (b) (6), a (b) (6) in EPA's Office of (b) (6), had informed the Scientific Integrity Official of this grievance.

Allegations of the loss of scientific or scholarly integrity are submitted to the EPA's Scientific Integrity Official (ScIO). Three criteria are considered when establishing a loss of scientific integrity:

- a. There is a significant departure from accepted practices of the relevant scientific or scholarly community;
- b. The actions causing the loss of integrity are committed intentionally, knowingly or recklessly; and,
- c. The allegation is proven by a preponderance of evidence.

When the Scientific Integrity Program finds a violation, it issues recommendations to safeguard the science. When it finds no violations but believes it can assist the participants in advancing

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\* <https://www.epa.gov/risk/policy-epa-scientific-integrity>

scientific integrity considerations, the Scientific Integrity Program provides advice. This report contains both.

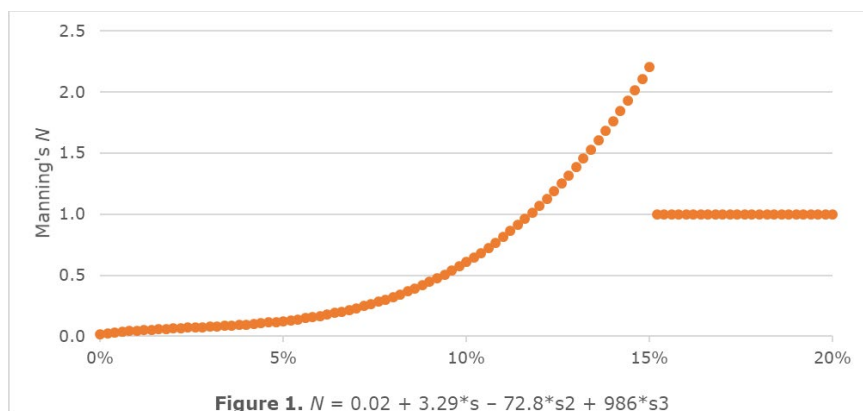
A Scientific Integrity Review Panel, composed of three Deputy Scientific Integrity Officials, reviewed this report and reached consensus on its findings, advice, and recommendations.

### **Background from a prior inquiry**

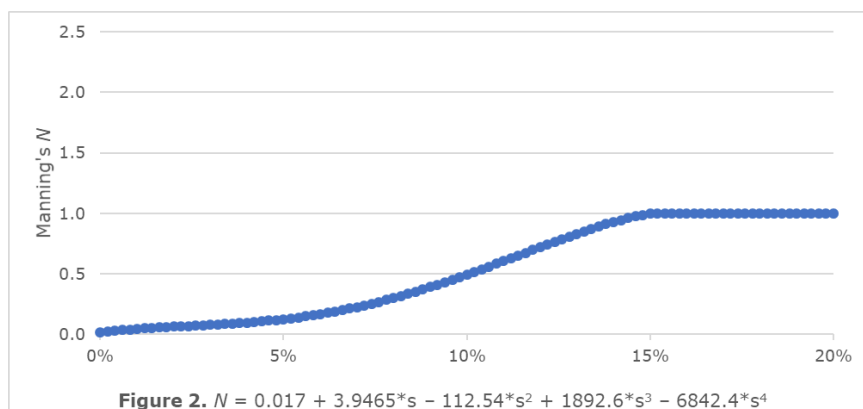
On June 8, 2018, (b) (6) an Environmental Engineer in EPA's (b) (6), filed a grievance related to a paper published in (b) (6). (b) (6) asked that (b) (6) seek retraction of the paper and that (b) (6), corresponding author and branch chief, write a letter of apology to the journal editor and to (b) (6). Prior to the grievance, (b) (6) had asked that the paper's acknowledgment section be corrected to remove (b) (6) name and (b) (6) had asked the journal to do this, but as this was not covered by the journal's policies, the journal denied the request. On June 11, (b) (6) expanded the grievance to include plagiarism, alleging that the published paper includes an equation derived from his earlier work, which (b) (6) had asked not to be used.

On June 21, 2018, (b) (6), a (b) (6) (b) (6) in EPA's Office of (b) (6), informed the Scientific Integrity Program of this grievance and provided details during a conference call on June 28. The Scientific Integrity Program's inquiry included a review of the materials submitted with (b) (6) (b) (6)'s grievance and telephone interviews with (b) (6) (b) (6) and with two other EPA scientists who had been listed as co-authors in a 2014 draft of the paper. Both former co-authors verified that they had worked with (b) (6) and vouched that he had a major role in developing the manuscript and the underlying modeling. The inquiry compared the equation in question with one developed by (b) (6) for the 2014 draft. On September 5, 2018, (b) (6) from the Scientific Integrity Program informed (b) (6) (b) (6) that he had found technical irregularities in the published paper that support (b) (6) (b) (6)'s claim as the developer of an integral part of this work.

Briefly, the technical irregularities arise from the use of a 3rd-power regression model in the published paper to estimate a parameter called Manning's  $N$ , "with slopes(s) above 15% assigned a maximum value of 1." Using this model,  $N$  reaches a value of 1 for a slope between 11% and 12%, then continues to increase, creating a discontinuity when it is assigned a value of 1 for slopes above 15%, as illustrated by figure 1.



The 2014 draft (exhibit 4b, dated 17 Sept 2014, from (b) (6) (b) (6)'s grievance) used a 4th-power model to estimate Manning's  $N$ , also "with slopes above 15% assigned maximum value of 1." (b) (6) (b) (6) had identified the need for a maximum value for slopes above 15% in a message to co-author (b) (6) (b) (6) (dated 20 June 2014), though he indicated that slopes this high would not be typical. The 4th-power model is consistent with the specification of  $N = 1$  for slopes above 15% and provides a smooth curve across all slopes, as illustrated by figure 2.



Thus, the assignment of  $N = 1$  for slopes above 15% is a clear indicator of the modeling work done by (b) (6) (b) (6) and the inconsistency introduced by the 3rd-power model.

### Follow-up questions from (b) (6) (b) (6)

On October 3, 2018, (b) (6) (b) (6), (b) (6) (b) (6), asked the Scientific Integrity Program to address additional questions:

- “1. Did (b) (6) (b) (6), as lead author of the modeling system paper, use (b) (6) (b) (6)'s exact calibration equation to support the paper's modeling simulations? If yes, Did Mr. (b) (6) (b) (6)'s use of (b) (6) (b) (6)'s equation constitute plagiarism as defined under the Agency's Scientific Integrity Policy?

- “2. Was (b) (6) (b) (6), as lead author of the modeling system paper, permitted to use the scientific work of Mr. (b) (6) to the extent that the scientific work was created primarily on Agency time and fell within the scope of (b) (6) (b) (6) job duties and responsibilities? If yes, would (b) (6) (b) (6)’s request of (b) (6) (b) (6) not to use (b) (6) scientific work in the paper change your answer?”
- “3. Was (b) (6) (b) (6), as lead author of the modeling system paper, required to give (b) (6) (b) (6) credit (e.g., an Acknowledgement) for his contributions to the paper despite Mr. (b) (6)’s objection to being given such credit?”
- “4. Did (b) (6) (b) (6) as lead author of the modeling system paper, egregiously and willfully mislead the Journal of (b) (6) modeling, its readers, and the public as it relates to the paper’s handling and parameterization of Manning’s n parameter for stream bed channels in (b) (6) study?”
- “5. Did Mr. (b) (6), as lead author of the modeling system paper, follow proper clearance procedures in (b) (6) regarding the publishing of the paper?”

## Method of inquiry

As (b) (6) questioned only actions of (b) (6), the inquiry focused on (b) (6) responses to various points raised by (b) (6) questions. Other perspectives had been well documented in the materials supporting the grievance filed by (b) (6) and in the prior interviews mentioned above with (b) (6) (b) (6) and with other EPA scientists. Remaining questions about (b) (6) clearance procedures during 2014 were answered by an email exchange with a (b) (6) Technical Information Manager.

Then, as some of (b) (6) (b) (6)’s questions concerned topics not discussed in EPA’s Scientific Integrity Policy (e.g., intellectual property rights to work performed as part of federal employment, current practices for authorship credit when credit is refused), the Scientific Integrity Program consulted with other organizations. The Scientific Integrity Program asked EPA’s Office of (b) (6) for their opinion on the issue of intellectual property rights and asked two editors of scientific journals that comply with policies of the (b) (6) for their views on authorship credit (one did not respond).

## Timeline of events mentioned in this report

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|--------------|---|
| 20 June 2014 | (b) (6) (b) (6) identifies the need for a cutoff for slopes above 15%.  |
| 24 July 2014 | (b) (6) (b) (6) asks (b) (6) (b) (6) to leave him off the paper and not to use his model.                                 |
| 22 Aug 2014  | (b) (6) (b) (6) identifies (b) (6) as the target journal.   |
| 18 Sept 2014 | (b) (6) (co-author of published paper and first author of 2014 draft) writes that (b) (6) (b) (6) should be first author. |

18 Sept 2014 (b) (6) informs the team of (b) (6)'s requests and indicates he would comply.

22 Sept 2014 Internal review of the manuscript is completed.

22 Sept 2014 (b) (6) (b) (6) (division director) citing (b) (6) authorship guidance and (b) (6)'s message, confirms that (b) (6) should be first author.

23 Sept 2014 Mr. (b) (6) confirms for (b) (6) his request to be off the paper.

25 Sept 2014 (b) (6) entry initiated.

30 Sept 2014 Division director approves the manuscript for submission.

August 2015 Effort for the (b) (6) spill pulls several people off the project.

16 Sept 2016 Manuscript received by (b) (6).

21 March 2017 Manuscript received in revised form and accepted by (b) (6); final manuscript placed into (b) (6);

14 April 2017 Manuscript available online from (b) (6).

27 April 2017 Final (b) (6) entry: manuscript approved for publication.

## Findings, advice, and recommendations

### Question 1. Use of (b) (6) (b) (6)'s model; plagiarism

**Background.** The draft manuscript initially used a 4th-power model developed by (b) (6) for a parameter called Manning's  $N$ . As the paper was being readied for submission to a journal, the working relationship between (b) (6) (b) (6) and (b) (6) broke down, and Mr. (b) (6) asked that the paper not mention him or include his model. (b) (6) (b) (6) agreed, and the 4th-power model was replaced by a 3rd-power model in the draft manuscript that was reviewed internally, submitted to a journal, and eventually published.

In his grievance, (b) (6) (b) (6) alleges that the 3rd-power model "appears to have been fitted against [his] 4th-order equation." (b) (6) alleges that this is "misrepresentation and plagiarism."

**Findings with regard to modeling.** During the inquiry, (b) (6) (b) (6) was asked how the 3rd-power equation was developed, the source of the data used to fit the 3rd-power model, and whether any data were derived from the output of the 4th-power model. Mr. (b) (6) stated that the 3rd-power model was new, that it was developed by fitting a 3rd-power curve to the same data that (b) (6) (b) (6) used for the 4th-power model, and that no results of (b) (6) (b) (6)'s modeling were used. Specifically, (b) (6) (b) (6) wrote,

(b) (6) indicated by email that (b) (6) wanted his contribution removed, which was a 4th-power equation. A novel, 3rd-power equation was developed in place of the 4th-power as an acceptable, more parsimonious equation to complete the work.

The 3rd-power equation was developed by one of the co-authors with the data used to fit the higher order polynomial. No data derived from the output of the higher order polynomial were used that I'm aware of.

### Evaluation of criteria

Criteria for establishing a loss of scientific integrity	Evaluation
a. Significant departure from accepted practices	Not established. (b) (6)'s suggestion of fitting a 3rd-power model to his 4th-power model is one possibility, but so is fitting both models to the same data.
b. Committed intentionally, knowingly or recklessly	Not applicable.
c. Proven by preponderance of evidence	Not proven.

**Advice and recommendations** related to these findings are listed under questions 2 and 3 below.

**Findings with regard to plagiarism.** Plagiarism is defined at 65 FR 76262 as “the appropriation of another person’s ideas, processes, results, or words without giving appropriate credit.”

This is not an issue in this case. The data used to fit the models, as well as the very model developed by (b) (6), belong to EPA (see findings for question 2, below). (b) (6) had credited (b) (6) as a co-author up to and through the draft submitted 17 Sept 2014 for internal review. (b) (6) refused authorship credit or other acknowledgment (see findings for question 3, below).

### Evaluation of criteria

Criteria for establishing a loss of scientific integrity	Evaluation
a. Significant departure from accepted practices	Not established.
b. Committed intentionally, knowingly or recklessly	Not applicable.
c. Proven by preponderance of evidence	Not proven.

**Advice and recommendations** related to these findings are listed under questions 2 and 3 below.

## Question 2. Use of work created on EPA time

**Background.** At issue is whether an EPA employee has intellectual property rights to work developed as part of official duties and whether the employee can set limits on EPA's use of such work.

**Findings.** In response to questions asked during the inquiry, EPA's Office of (b) (6) wrote,

There is no personal or individual intellectual property right in any work created in your EPA capacity. What an employee creates as part of (b) (6) federal employment belongs to the United States, not to the employee. The staff scientist does not have the right to prevent use of the work nor the right to force the branch chief to use the work.

Therefore, (b) (6) was permitted to use the scientific work of (b) (6), as the scientific work was created primarily on EPA time and fell within the scope of (b) (6)'s job duties and responsibilities.

In this case, however, (b) (6) acceded to (b) (6)'s request not to use the model (b) (6) developed. This might be considered a professional courtesy on the part of (b) (6) but it also made it imperative to develop a replacement model, and it appears that nobody considered whether a slope of 15% was still the appropriate cutoff for the maximum value of  $N$ . It is unfortunate that this error was not discovered during peer review.

**Evaluation of criteria.** Question 2 concerns intellectual property rights to work performed as part of federal employment. It is not an allegation of a violation of scientific integrity, accordingly, the criteria are not evaluated here.

**Advice.** EPA employees should be made aware that work created as part of their federal employment belongs to the government, not to employees individually. Although employees do have the right of last review to be certain their work is presented accurately,<sup>†</sup> they do not control whether EPA uses or does not use their work.

## Question 3. Credit for work when credit is refused

**Background.** On 24 July 2014, (b) (6) asked (b) (6) to leave him off the paper, and he confirmed this for the division director, (b) (6), in a message dated 23 Sept 2014. On 18 Sept 2014, (b) (6) informed the team of (b) (6) request and wrote that he would remove his name from the list of authors and from the

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<sup>†</sup> EPA employees have a role in ensuring their work is presented accurately. Under EPA's Scientific Integrity Policy [§IV.B.1], EPA scientists are expected to "review, correct, and approve the scientific content of any proposed Agency document intended for public dissemination that significantly relies on their research, identifies them as an author, or represents their scientific opinion." In this case, however, this provision does not apply, as the published paper is not an EPA document.



acknowledgments. (b) (6) also indicated that he would remove the equation developed by (b) (6). (b) (6).

In the published paper, (b) (6) (b) (6)'s name does not appear in the list of authors. (b) (6) is, however, the fourth of seven people named in the acknowledgments: (b) (6) (USEPA) is acknowledged for (b) (6) contributions to team discussions."

**Findings.** During the inquiry, (b) (6) (b) (6) explained that (b) (6) (b) (6) "was mentioned with others in the Acknowledgements for their contributions to the project."

Acknowledgment credit is governed by (b) (6)'s authorship guidance (available at [https://\(b\) \(6\).pdf](https://(b) (6).pdf), July 2011). Section 7.0 states, "Like authorship, written permission should be obtained from individuals before their names appear in print in the Acknowledgments."

In response to questions asked during the inquiry, EPA's Office of (b) (6) wrote,

This question is solely a scientific integrity issue having to do with attribution and appropriate credit. If the contributing scientist declines to have his/her name associated with the product, then that's a personal election. The scientist no longer has the right to claim his/her work is being usurped.

This advice is consistent with current practice at scientific journals. The journal editor contacted during this inquiry wrote, "... the person would have to agree to be acknowledged, and if they refuse (in writing) then they effectively forfeit any credit in the publication."

### Evaluation of criteria

Criteria for establishing a loss of scientific integrity	Evaluation
a. Significant departure from accepted practices	Established. Based on (b) (6) authorship guidance and current practice at scientific journals, (b) (6) (b) (6) should not have mentioned (b) (6) (b) (6) in the acknowledgments.
b. Committed intentionally, knowingly or recklessly	Although motives are difficult to discern, (b) (6) (b) (6)'s explanation during the inquiry did not claim this to be an error.
c. Proven by preponderance of evidence	Proven.

### Recommendation

**3(a).** If (b) (6) has not already done so, (b) (6) (b) (6) should apologize in writing to (b) (6) (b) (6) for including (b) (6) name in the acknowledgments after agreeing not to do so. Although the acknowledgment appears rather innocuous, it is against (b) (6) authorship



guidance and was a sensitive matter. Moreover, (b) (6) had already informed the team, including (b) (6) (b) (6), that he would not mention him in the acknowledgments.

### Advice

**3(b).** All people involved in the development of any journal manuscript should review it immediately prior to submission and again immediately prior to publication. This is essential to ensuring that all co-authors agree with the final version and that all co-authors and contributors have been appropriately recognized. If this had been done in this case, someone likely would have recognized that (b) (6) (b) (6) had been mentioned without (b) (6) consent. Going forward, a useful resource is EPA's Best Practices for Designating Authorship (available at (b) (6)).

**3(c).** (b) (6) should consider requiring clearing authors to collect the permissions specified in its authorship guidance and to load them into (b) (6) for approving officials to verify. (b) (6) also should consider asking all individuals granting permission to affirm that they agree with the final version and that it appropriately recognizes all co-authors and contributors. The Office of (b) (6) as a whole and other EPA organizations also should consider adopting this advice.

**3(d).** It is unfortunate that (b) (6) (b) (6) felt compelled to withdraw from the paper after having made an integral contribution to the work, and that there was not more effort to resolve the matter so (b) (6) could feel proud to accept the authorship (b) (6) had earned. Section 4 of EPA's Best Practices for Designating Authorship specifies, "The supervisor in the primary author's chain of command who does not have a conflict of interest should facilitate resolution of the issue." EPA supervisors should make it their responsibility, before and during clearance, to strive to resolve authorship disputes in a manner that gives appropriate credit to all authors and contributors.

## Question 4. Potential misrepresentation

**Background.** (b) (6) asked the Scientific Integrity Program whether (b) (6), as lead author of the modeling system paper, egregiously and willfully misled the Journal of (b) (6), its readers, and the public as it relates to the paper's handling and parameterization of Manning's  $N$ . The model for Manning's  $N$  originally had been developed by (b) (6). After he requested that the paper not mention him or include (b) (6) model, it was replaced by a model developed by other co-authors (see findings for question 3).

(b) (6) (b) (6) phrase "egregiously and willfully mislead" first appeared in (b) (6) (b) (6)'s grievance and refers to the paper's handling and parametrization of Manning's  $N$ . This inquiry evaluated (b) (6) (b) (6) question under the standard used by the Scientific Integrity Program to determine whether there has been a loss of scientific integrity: whether the action was committed "intentionally, knowingly or recklessly."

**Findings.** The replacement model in the published paper contains a discontinuity, as the condition  $N = 1$  for slopes above 15% applies to the equation developed by (b) (6) (b) (6).

but not to the equation in the published paper (see figures above). This is consistent with forgetting to check where the condition  $N = 1$  applies or with erroneously assuming the same condition for the two models. In either case, it cannot be concluded that there was an egregious and willful attempt to mislead the journal or its readers.

There was also a failure on the part of the peer reviewers for the journal, who did not identify this discontinuity.

### Evaluation of criteria

Criteria for establishing a loss of scientific integrity	Evaluation
a. Significant departure from accepted practices	Not established. The only developers of models for Manning's $N$ are (b) (6) and co-authors of the published paper, and (b) (6) refused credit.
b. Committed intentionally, knowingly or recklessly	Not applicable.
c. Proven by preponderance of evidence	Not proven.

### Advice

**4(a).** Rather than a retraction, (b) (6) should consider an erratum to inform the journal of a correct approach for the imposition of a maximum value for Manning's  $N$ .

**4(b).** More generally, manuscripts that include original modeling should have an internal reviewer specifically check the modeling results. This could have averted the discontinuity present in the published paper. This advice would be an augmentation of EPA's Peer Review Handbook, which specifies which products should receive peer review but not the technical depth to which models are reviewed.

### Question 5. Clearance procedures

**Background.** The (b) (6) entry for this manuscript ((b) (6)) was initiated on 25 Sept 2014. It includes the pre-submission manuscript (dated 24 Sept 2014) and a review (completed 22 Sept 2014) by (b) (6). The review rated the manuscript satisfactory in all respects and acceptable after minor revisions, which were detailed on two additional pages and in a marked-up draft of the manuscript. The revised manuscript was approved for submission 30 Sept 2014 by (b) (6).

Post-submission, the (b) (6) entry includes a comment-and-response to the journal's second round of review, which indicates that there had been an earlier round with two peer reviewers. There is also a final manuscript (dated 21 March 2017). The workflow comment report in (b) (6) indicates that the final manuscript was published online on 14 April 2017 and approved by (b) (6) on 27 April 2017. These dates agree with the

paper as published in (b) (6): received 16 Sept 2016, received in revised form and accepted 21 March 2017, and available online 14 April 2017.

**Findings.** During the inquiry, (b) (6) was asked about the 3-year delay between clearance initiation in 2014 and approval in 2017. (b) (6) responded that the (b) (6) spill in August 2015 pulled several people off the project until that effort was completed.

It can be noted that internal (b) (6) correspondence indicates that on 22 Aug 2014 the target journal had been another (b) (6) journal, (b) (6), and that ten months had elapsed between clearance on 30 Sept 2014 and the (b) (6) effort beginning in August 2015. If there had been an earlier submission to this or another journal, that history does not appear in (b) (6). (It is not a scientific integrity issue to switch journals or to submit a manuscript to another journal after it is withdrawn from the first.)

(b) (6) Policies and Procedures Manual, Section 14.3] and the (b) (6) Technical Information Manager training do not appear to require that comments from journal peer-reviewers be loaded into (b) (6). Sampling of several completed peer-reviewed journal article entries in (b) (6) reveals that it is often the practice not to load these comments.

During the inquiry, the TIM for the clearance of this manuscript indicated that it was standard procedure at the time to have only one technical reviewer. Regarding approvals, there should have been two levels of approval. The TIM could not find an established routing, but as the lead author ((b) (6)) was a branch chief, it would likely be the deputy division director and the director. In this case, however, both had just left EPA and the new deputy wasn't a scientist, so the acting division director approved the submission. The TIM stated that she was not asked to abbreviate the approval process by either the acting director or by (b) (6) (b) (6).

**Evaluation of criteria**

<b>Criteria for establishing a loss of scientific integrity</b>	<b>Evaluation</b>
a. Significant departure from accepted practices	Not established. There does not appear to be a serious violation of clearance procedures in (b) (6) though detailed documentation of approval sequences and materials required to be loaded is difficult to locate. In any case, (b) (6) management and not the Scientific Integrity Program is in a better position to determine whether its specific procedures in effect several years ago were followed.
b. Committed intentionally, knowingly or recklessly	Not applicable.
c. Proven by preponderance of evidence	Not proven.

**Advice.** (b) (6) could review its past use of (b) (6) to determine whether follow-up instructions for clearing authors, supervisors, or TIMS would be appropriate. More generally, this could also be carried out at the (b) (6).